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(backplane near3 (card or board))same switch\$3 same (hot adj1 (plug\$4 or swap\$4))	15

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 or swap\$4))

15

L1

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<u>L2</u> <u>L1</u>		0	<u>L2</u>
	<i>DB=PGPB,USPT,USOC; PLUR=YES; OP=OR</i>		
<u>L1</u>	(backplane near3 (card or board))same switch\$3 same (hot adj1 (plug\$4 or swap\$4))	15	<u>L1</u>

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Search Results -

Terms	Documents
(439/92 361/695 361/720 361/752 361/683 361/687 709/222 709/227 709/219 709/203 709/223 710/301 710/302 710/72 710/304 307/46 307/66 363/123 713/100).ccls.	21744

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L3 710/301,302,72,304;713/100;709/222,227,219,203,223;361/695,720,752,683,687;363/123;439/92

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L2 L1

DB=PGPB,USPT,USOC; PLUR=YES; OP=OR

L1 (backplane near3 (card or board))same switch\$3 same (hot adj1 (plug\$4 or swap\$4))

END OF SEARCH HISTORY

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 Trash

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 DBs USPAT
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BRS I S&R Image Text HTML

	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments	Error Definition	Err
1	BRS	L1	98	(backplane near3 (card or board)) same switch\$3 same	USPAT	2004/11/01 13:11			0
2	BRS	L2	8	(backplane near3 (card or board)) same switch\$3 same	USPAT	2004/11/01 13:12			0

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EAST - [Untitled1:1]

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☐ Queue
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 Queue
 Trash

Search
 DBs: USPAT
 Default operator: OR
 Plurals
 Highlight all hit terms initially

(backplane near3 (card or board)) same switch\$3 same (hot
 adj1 (plug\$4 or swap\$4))

BRSI... IS&R... Image Text HTML

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	R
1	<input type="checkbox"/>	<input type="checkbox"/>	US 6771514 B1	20040803	12	Keyed bumper device for electronic card and/or	361/786	361/787; 361/788;	
2	<input type="checkbox"/>	<input type="checkbox"/>	US 6675254 B1	20040106	26	System and method for mid-plane interconnect using	710/316	709/239; 710/317	
3	<input type="checkbox"/>	<input type="checkbox"/>	US 6591324 B1	20030708	7	Hot swap processor card and bus	710/302	710/300	
4	<input type="checkbox"/>	<input type="checkbox"/>	US 6528904 B1	20030304	9	Power management strategy to support hot swapping of	307/140	307/119; 307/135;	
5	<input type="checkbox"/>	<input type="checkbox"/>	US 6347345 B1	20020212	17	Information transfer apparatus having control	710/20	370/229; 370/230;	
6	<input type="checkbox"/>	<input type="checkbox"/>	US 6212586 B1	20010403	10	Hot-swappable high speed point-to-point interface	710/302	326/21; 326/90;	
7	<input type="checkbox"/>	<input type="checkbox"/>	US 6091609 A	20000718	25	Electronic circuit card having transient-tolerant	361/794	307/43; 361/729;	
8	<input type="checkbox"/>	<input type="checkbox"/>	US 6032209 A	20000229	11	Hot-swappable high speed point-to-point interface	710/302	326/21; 326/90;	

Start EAST - [Untitled1:1]

EAST - [Untitled1:1]

File View Edit Tools Window Help

Drafts
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 L1: (24507) DC near10 powe
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 DBs: USPAT Plurals
 Default operator: OR Highlight all hit terms initially

11 same (distribut\$3 or provid\$3) same ((operational or desired) near3 voltages)

BRS: IS&R Image Text HTML

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef R
1	<input type="checkbox"/>	<input type="checkbox"/>	US 5994875 A	19991130	15	Battery charging apparatus and method with charging	320/132	320/136
2	<input type="checkbox"/>	<input type="checkbox"/>	US 5790392 A	19980804	10	Intelligent power supply with staged loading	363/49	323/901; 363/78
3	<input type="checkbox"/>	<input type="checkbox"/>	US 5352349 A	19941004	15	Method for reviving an electrode of a biosensor	205/778	204/402; 204/403.11;
4	<input type="checkbox"/>	<input type="checkbox"/>	US 5081442 A	19920114	15	Fault detector for an air bag system	340/438	280/734; 280/735
5	<input type="checkbox"/>	<input type="checkbox"/>	US 5033112 A	19910716	21	Closed loop, programmable power and communication	398/110	340/310.08; 398/111;
6	<input type="checkbox"/>	<input type="checkbox"/>	US 4258991 A	19810331	15	Electronic flash apparatus for a camera	396/203	315/133; 396/284;
7	<input type="checkbox"/>	<input type="checkbox"/>	US 4200795 A	19800429	14	Pulsate X-ray generating apparatus	378/106	378/101; 378/4
8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	US 4012617 A	19770315	14	Power controller for microwave magnetron	219/716	219/718; 323/223;

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Manuel, A.; Roset, X.; Gomez, J.; Garrido, A.; Carlosena, A.; Romos, R.;
 Instrumentation and Measurement Technology Conference, 1999. IMTC/99.
 Proceedings of the 16th IEEE , Volume: 2 , 24-26 May 1999
 Pages:1206 - 1210 vol.2

[\[Abstract\]](#)[\[PDF Full-Text \(672 KB\)\]](#)**IEEE CNF**

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Signal switching in automated test system for the t function characterization

Manuel, A. Roset, X. Gomez, J. Garrido, A. Carlosena, A. Romos, R.

Escola Univ. Politecnica de Vilanova i la Geltru , Spain;

This paper appears in: Instrumentation and Measurement Technology C 1999. IMTC/99. Proceedings of the 16th IEEE

Meeting Date: 05/24/1999 - 05/26/1999

Publication Date: 24-26 May 1999

Location: Venice Italy

On page(s): 1206 - 1210 vol.2

Volume: 2

Reference Cited: 7

Number of Pages: 3 vol.xl+1937

Inspec Accession Number: 6440113

Abstract:

This paper is focussed on a low cost modular instrumentation system achieve GPIB interface target using VLSI specialized integrated circuits and several m capabilities programmable instrument targets have been designed to provide and versatile instrumentation system using a support bus to interconnect the module-instrument STD **backplane**. A computer-based virtual instrument (VI) perform a dynamical characterization of DC-DC **switching** converters has been implemented using this modular instrument, the VI is devoted to the test of t devices used as duty cycle controllers in the design of **switched** DC-DC conv. VI has been implemented using a **switching** module which has been designe **plug-in card** in the STD bus instrumentation system, performing both signal data acquisition. As an example, Y_{in} and Z_{out} characterization of a PWM-base converter have been obtained

Index Terms:

DC-DC power convertors PWM power convertors VLSI automatic test equipment modules pulse width modulation transfer functions virtual instrumentation DC-DC converters GPIB interface target PWM devices PWM-based boost converter STD instrumentation VLSI Y_{in} characterization Z_{out} characterization automated test sys computer-based virtual instrument data acquisition duty cycle controllers dynamical

[characterization](#) [low cost modular instrumentation](#) [modular instrument](#) [module-instru](#)
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US006675254B1

(12) **United States Patent**
Wachel

(10) Patent No.: **US 6,675,254 B1**
(45) Date of Patent: **Jan. 6, 2004**

(54) **SYSTEM AND METHOD FOR MID-PLANE
INTERCONNECT USING SWITCHED
TECHNOLOGY**

(75) Inventor: **Robert D. Wachel, Altadena, CA (US)**

(73) Assignee: **Intel Corporation, Santa Clara, CA
(US)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 442 days.

(21) Appl. No.: 09/676,173

(22) Filed: **Sep. 29, 2000**

(51) Int. Cl.⁷ **G06F 1/00**

(52) U.S. CL. **710/316; 710/317; 709/239**

(58) Field of Search **710/305-306,
710/316-317, 300-302; 709/201, 227, 229-230,
238-242**

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Primary Examiner—Paul R. Myers

Assistant Examiner—Raymond N Phan

(74) *Attorney, Agent, or Firm*—Kenyon & Kenyon

(57) **ABSTRACT**

A system and method for transferring information at a fast rate between add-in cards in a rack mount system are described. In one embodiment, the invention allow all the add-in cards within the rack mount system to be interconnected. All the main cards within the rack mount system connect to a switch card using point-to-point differential copper pairs. All communication over these differential copper pairs use a messaging protocol that provides a messaging protocol destination address that is used to route the information to the intended destination main card. The messaging protocol may be the Ethernet protocol. In an alternative embodiment, data redundancy is provided by having two switch cards in the rack mount system. A particular main card transmits one set of information to the first switch card and a second set of information (that is identical to the first set of information) to the second switch card. The first switch card routes the first set of information to a particular one of the main card that is the intended destination and the second switch card routes the second set of information to the destination main card (i.e., the first switch card and the second switch card transfer the first set of information and the second set of information to the same destination main card). The destination main card uses the information that is first-to-arrive but if the information that is first-to-arrive has an error, then the later-to-arrive information is selected for use. The point-to-point differential copper pairs between the main cards and the one or more switch cards are referred to as a switched Ethernet interconnect. The switched Ethernet interconnect may be integrated within the mid-plane or using external cables.

18 Claims, 15 Drawing Sheets





US006591324B1

(12) **United States Patent**
Chen et al.

(10) Patent No.: **US 6,591,324 B1**
(45) Date of Patent: **Jul. 8, 2003**

(54) **HOT SWAP PROCESSOR CARD AND BUS**

(75) Inventors: Hsiang-Chan Chen, Taipei (TW);
Hui-Guo Tung, Taipei Hsien (TW)

(73) Assignee: Nexcom International Co. Ltd.,
Chung-Ho (TW)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 386 days.

(21) Appl. No.: 09/614,563

(22) Filed: Jul. 12, 2000

(51) Int. Cl.⁷ G06F 13/00

(52) U.S. Cl. 710/302; 710/300

(58) Field of Search 710/300, 301,
710/302, 303, 304; 714/11, 13, 41

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Primary Examiner—Kuan M. Thai

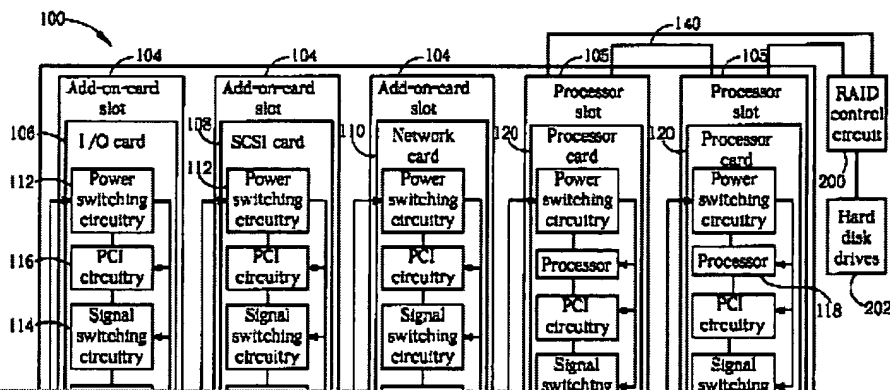
Assistant Examiner—Tim Vo

(74) Attorney, Agent, or Firm—Winston Hsu

(57) **ABSTRACT**

A processor card has a connector for plugging into a processor slot, signal switching circuitry electrically connected to the connector, power switching circuitry for controlling power to the processor card and a processor electrically connected to the signal switching circuitry. The power switching circuitry allows power to be selectively delivered to the processor card, and the signal switching circuitry enables the processor card to be hot swapped in and out of a PCI hot swap bus. The processor card works in conjunction with a similar processor card on the bus to perform the hot swap procedure.

14 Claims, 2 Drawing Sheets





US006212586B1

(12) **United States Patent**
Mros et al.

(10) Patent No.: **US 6,212,586 B1**
(45) Date of Patent: ***Apr. 3, 2001**

(54) **HOT-SWAPPABLE HIGH SPEED POINT-TO-POINT INTERFACE**

(75) Inventors: Stanley P. Mros, Roseville; Kevin J. Jenkins, Elk River, both of MN (US)

(73) Assignee: Storage Technology Corporation, Louisville, CO (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: 09/456,659

(22) Filed: Dec. 9, 1999

Related U.S. Application Data

(63) Continuation of application No. 09/122,540, filed on Jul. 24, 1998, now Pat. No. 6,032,209.

(51) Int. Cl.⁷ G06F 13/00; G06F 13/14; H02J 1/16; H03K 17/16

(52) U.S. Cl. 710/103; 710/106; 326/21; 326/90

(58) Field of Search 710/101-103, 710/1-2; 326/21, 90

(56) **References Cited**

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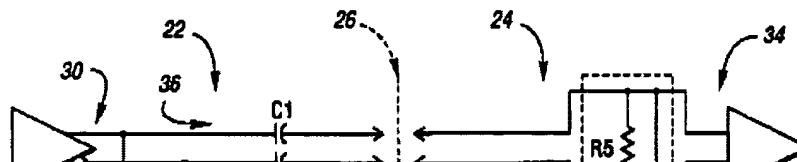
Primary Examiner—Sumati Lefkowitz

(74) *Attorney, Agent, or Firm*—Brooks & Kushman P.C.

(57) **ABSTRACT**

Transmission between two cards is disabled if power is not supplied to one of the cards. The system includes a first card generating a first power signal based on power applied to the first card. A second card, in communication with the first card, generates a second power signal based on power applied to the second card. A transmitter on the first card transmits to a receiver on the second card. The transmitter is disabled from transmitting based on the second power signal and the receiver is disabled from receiving based on the first power signal.

12 Claims, 4 Drawing Sheets



US-PAT-NO: 5081442

DOCUMENT-IDENTIFIER: US 5081442 A

TITLE: Fault detector for an air bag system

----- KWIC -----

Brief Summary Text - BSTX (9):

The comparator circuit 8 consists of resistors 81 to 83 connected in series for dividing the voltage of the dc power source 1 and thereby providing reference voltages, an operational amplifier 84 a non-inverted input terminal of which is connected to a junction of resistors 81 and 82 whilst an inverted input terminal of which is connected to the output terminal of the operational amplifier 75, an operational amplifier 85 an inverted input terminal of which is connected to a junction of resistors 82 and 83 whilst a non-inverted input terminal of which is connected to the output terminal of the operational amplifier 75, and an AND gate 86 for multiplying the outputs of the operational amplifiers 84 and 85.

United States Patent (19)

Ito et al.

[11] Patent Number: 5,081,442

[45] Date of Patent: Jan. 14, 1992

[54] FAULT DETECTOR FOR AN AIR BAG SYSTEM

[75] Inventors: Hisatsugu Ito; Takashi Furui, both of Saito, Japan

[73] Assignee: Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

[21] Appl. No.: 884,961

[22] Filed: Sep. 19, 1990

[30] Foreign Application Priority Data

Dec. 20, 1989 [JP] Japan 1-328362

[51] Int. Cl. B60Q 1/00; B60R 21/32

[52] U.S. Cl. 340/438; 280/738; 280/734

[58] Field of Search 340/438, 439, 500, 425.5; 280/734, 735; 180/271; 307/9.1, 10.1

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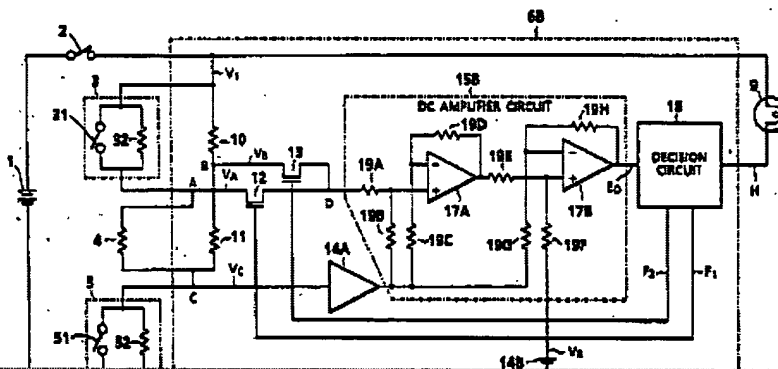
Primary Examiner—Donnie L. Croeland

Attorney, Agent, or Firm—Burns, Doane, Swecker & Mathis

[57] ABSTRACT

A fault of a trigger resistor or a squib resistor of an air bag system is monitored together with other resistors by utilizing a balanced Wheatstone bridge for providing an inexpensive and highly reliable fault detector, wherein first and second junctions of the Wheatstone bridge are connected alternately to a dc amplifier circuit with use of first and second switching circuits for applying a voltage across the squib resistor and a reference voltage alternately on an input terminal of the dc amplifier circuit, amplified voltages are fed from the dc amplifier circuit to a decision circuit to check whether or not the voltage across the squib resistor is within an allowable limit from the reference voltage, the amplified reference voltage is fed from the dc amplifier circuit to a voltage regulating circuit, which has a feedback circuit to the dc amplifier circuit, with use of a third switching circuit for adjusting an output of the voltage regulator to the center value of the input voltage range of the decision circuit, and thereby making it possible to measure a voltage difference at the first and second junctions without being influenced by a fluctuation of the supply voltage or a change of resistance ratio of acceleration sensors.

11 Claims, 7 Drawing Sheets



Detailed Description Text - DETX (2):

Referring initially to FIG. 1, a simplified overview of the system according to the invention illustrates mains voltage 10 from the utility service introduced to the building (not shown) at the load centre 12. In addition to the normal 110 volt, 60 Hz. the load centre or power source means is adapted to deliver 48 volts D.C. from a 48 V. DC converter 14. In accordance with the invention both of these voltages are available for distribution over a pair of electrical power conductors included in the power distribution cables 16 shown in solid line in FIG. 1. Also included in the distribution cable is an optical fiber 18 shown in dotted line running in parallel with the electrical power conductors. As illustrated the distribution cable 16 interconnects the power source 12 to the control interface 20 from which the distribution cable 16 extends to a plurality of power receptacles 22. Each receptacle 22 connected to the control interface 20 has in addition to a power delivery socket 24 a coupler 74 as best seen in FIG. 7C, capable of receiving a signal from the optical fiber 18 and transmitting a signal back to the optical fiber 18. The plug 26 mating with the socket 24 and attached to the appliance 28 for delivering power thereto also may include a coupler 74 connected to an optical fiber 18 which runs in parallel with power conductors to the appliance. Appliances in accordance with the invention may be provided with a pre-programmed microprocessor (not shown) which includes operational data specific to the appliance. When an appliance 28 is plugged into the socket 24 the control interface 20 transmits via the optical fiber 18 a light wave interrogation signal to the microprocessor. The interrogation signal is processed by the microprocessor and in response thereto returns a light signal via the optical fiber 18, which signal includes operational data such as voltage requirements, current range, operating frequency and operating temperature. The control signal from the microprocessor in the appliance 28 is assessed by the control interface 20 and if the data is within the specified conditions for that appliance the control interface 20 will, via the optical fiber 18, direct the power source 12 to provide the requested power to the appliance 28. The power source 12 includes switch means 15 which in response to a command signal from the control interface 20 selects the appropriate power from the bank of available power ranges in the power source. Thus, if the appliance 28 calls for 48 volts DC the switch means 15 will connect the appliance 28 to the 48 volt DC power source. Once having received the requirements of the appliance, the flow of power is continuously monitored to that particular cable, and if the draw of power deviates from the specified conditions, the power for the cable is switched off, and for example an alarm might be given.

United States Patent [19]

Bowling et al.

[11] Patent Number: 5,033,112

[45] Date of Patent: Jul. 16, 1991

[34] CLOSED LOOP, PROGRAMMABLE POWER AND COMMUNICATION SYSTEM

[75] Inventors: Geoffrey N. Bowling, Kanata; John C. Goodwin, Ottawa, both of Canada

[73] Assignee: Northern Telecom Limited, Montreal, Canada

[21] Appl. No.: 121,840

[22] Filed: Dec. 11, 1987

[30] Foreign Application Priority Data

Jul. 13, 1987 [CA] Canada 54091

[51] Int. Cl. H04B 10/12

[52] U.S. Cl. 435/603; 340/310 CP; 435/612; 435/617

[58] Field of Search 340/310 CP, 310 A, 310 R; 435/600, 603, 605, 612, 606, 607, 617; 370/3

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Primary Examiner—Reinhard J. Eisenhardt

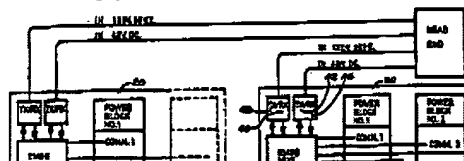
Assistant Examiner—L. Van Beek

Attorney, Agent, or Firm—Scott & Ayten

[57] ABSTRACT

A power and communication system for a building, and particularly a residential dwelling wherein there are provided a plurality of receptacles throughout the building, each connected by a cable to source, which may provide different voltages and either AC or DC and having a control interface for selectively switching the desired power to each cable individually. The control interface may also connect each cable to a selected signal transmission line, such as telephone, radio, TV, etc. The cable includes a pair of power conductors and a optical fiber which transmits to and receives from the control interface light signals informing the control interface what power or communication connection is required for a particular receptacle and possibly at the same time providing signal messages to each receptacle. The single optical cable can transmit an interrogating signal to the receptacle, which signal is transferred through a special plug and socket connection have a mating optical coupler to an appliance equipped with a microprocessor programmed for replying by way of light signals sent back to the interface through the same coupler and optical fiber. The control interface is thus informed as to what power and communication connections the appliance requires and to how the appliance should be subsequently monitored.

24 Claims, 10 Drawing Sheets



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☐ 1. Document ID: US 20020078290 A1

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L4: Entry 1 of 5

File: PGPB

Jun 20, 2002

PGPUB-DOCUMENT-NUMBER: 20020078290

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020078290 A1

TITLE: Cluster computer network appliance

PUBLICATION-DATE: June 20, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Derrico, Joel Brian	Atlanta	GA	US	
Freet, Paul Jonathan	Duluth	GA	US	

US-CL-CURRENT: [710/302](#)

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw De
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☐ 2. Document ID: US 6591324 B1

L4: Entry 2 of 5

File: USPT

Jul 8, 2003

US-PAT-NO: 6591324

DOCUMENT-IDENTIFIER: US 6591324 B1

TITLE: Hot swap processor card and bus

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw De
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☐ 3. Document ID: US 6212586 B1

L4: Entry 3 of 5

File: USPT

Apr 3, 2001

US-PAT-NO: 6212586

DOCUMENT-IDENTIFIER: US 6212586 B1

TITLE: Hot-swappable high speed point-to-point interface

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMMC	Drawn De
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☐ 4. Document ID: US 6091609 A

L4: Entry 4 of 5

File: USPT

Jul 18, 2000

US-PAT-NO: 6091609

DOCUMENT-IDENTIFIER: US 6091609 A

TITLE: Electronic circuit card having transient-tolerant distribution planes

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMMC	Drawn De
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☐ 5. Document ID: US 6032209 A

L4: Entry 5 of 5

File: USPT

Feb 29, 2000

US-PAT-NO: 6032209

DOCUMENT-IDENTIFIER: US 6032209 A

TITLE: Hot-swappable high speed point-to-point interface

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMMC	Drawn De
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